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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/280,268 03/29/99 MILLER

A 42390.P6147

EXAMINER

IM22/0525

MICHAEL A BERNADICOU  
BLAKELY SOKOLOFF TAYLOR & ZAFMAN  
12400 WILSHIRE BOULEVARD  
SEVENTH FLOOR  
LOS ANGELES CA 90025-1026

DECL. D.

ART UNIT

PAPER NUMBER

1765

DATE MAILED:

05/25/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

# Office Action Summary

Application No.

09/280,268

Applicant(s)

MILLER ET AL.

Examiner

DuyVu n Deo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

## Status

- 1) ☒ Responsive to communication(s) filed on 4/4/01.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☐ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☒ Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some \* c) ☐ None of the CERTIFIED copies of the priority documents have been:
1. ☐ received.
2. ☐ received in Application No. (Series Code / Serial Number) \_\_\_\_\_.
3. ☐ received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

## Attachment(s)

- 14) ☐ Notice of References Cited (PTO-892)
- 15) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 16) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.

- 17) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 18) ☐ Notice of Informal Patent Application (PTO-152)
- 19) ☐ Other: \_\_\_\_\_

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## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election of claims 1-14 and cancellation of claims 15-25 in paper #4 is acknowledged.
2. The declaration by Anne E. Miller A. Daniel Feller, and Kenneth C. Cadien establishing that the Applicants completed the present invention prior to the filing date of Grumbine (US 6,136,711) has been considered. The rejection is moot in view of the new ground(s) of rejection.

### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-5, 7, 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grover et al. (US 5,759,917).

Grover teaches a CMP slurry comprising: an aqueous medium such as de-ionized water (a liquid); a soluble cerium compound such as ammonium cerium nitrate in an amount about 0.05-10 wt%, this would produce cerium ions; an abrasive such as silica at about 2-25 wt%; (the abrasive, the liquid, and the cerium ions together would have a first pH value); a pH increasing substance such as ammonium hydroxide to increase the pH above 1.5 which would be preferably about 3.8-5.5 (ab, col. 2, line 20-68; col. 3, line 56-col. 4, line 30; col. 5, line 60-col. 6, line 8,

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line 30-37). Unlike claimed invention, Grover doesn't describe the cerium ions being in quantity equal to the inclusion of at least 0.02 molar or 0.05- 0.1 molar ammonium cerium nitrate in the liquid. However, he describes the concentration of ammonium cerium nitrate is about 0.05-10 wt%, which would include claimed at least 0.02 molar, it would have been obvious at the time of the invention for one skill in the art to determine the optimum concentration of etching parameters including pH, chemical concentration in the slurry through test run with an anticipation of an expected result.

Referring to claim 7, since the above slurry comprising the same component as that of the claimed invention, it would be also environmentally green.

5. Claims 1-5, 7, 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farkas et al. (US 5,773,364) and

Farkas describes a slurry comprising: an aqueous suspension of one or more abrasive species (claimed liquid and abrasive); ammonium cerium nitrate as etcher/oxidizer species, which would produce cerium ions; a pH increasing substance such as ammonium hydroxide (col. 3, line 21-25; line 64-col. 4, line 5, line 27-29, line 47). Unlike claimed invention, Farkas doesn't describe the polishing parameters such as pH, and chemical concentration in the slurry. Farkas also shows in his article of "Oxidation and Etching of the Tungsten in CMP Slurries" wherein table 1 and 2 shows different oxidizing agent concentrations and their pHs are run with their respective CMP rate and etch rate. The slurry also contains 3 wt% of abrasive of alumina. Silica-based slurry is also conventional and known to one skill in the art for polishing tungsten and metal (pg 25-31). Therefore, it would have been obvious at the time of the invention for one

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skill in the art to determine the optimum polishing parameters including pH, concentration of chemicals and other components in the slurry through test runs, which would also depending on the type of material being polished.

Referring to claim 7, since the above slurry comprising the same component as that of the claimed invention, it would be also environmentally green.

6. Claims 6, 8, 9 rejected under 35 U.S.C. 103(a) as being unpatentable over Farkas et al. (US 5,773, 364 and "Oxidation and Etching of W in CMP Slurries") as applied to claim 1 above, and further in view of Brusie et al. (Electrochemical Approach to Au and Cu CMP Process Development).

Unlike claimed invention, Farkas doesn't describe having glycine in the slurry. Brusie teaches a slurry for metal material wherein glycine is added in the slurry (pg 179, 180). It would have been obvious for one skill in the art to add glycine because Brusie shows that glycine increases the dissolution rate of copper metal in the slurry.

Referring to claim 6, adding glycine would also change the pH of the slurry. The amount of glycine shows in the examples of Brusie would be enough to increase the pH of the slurry above 1.5.

7. Claims 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farkas et al. (US 5,773, 364 and "Oxidation and Etching of W in CMP Slurries") as applied to claim 1 above, and further in view of Grumbine et al. (US 6,083,419).

Using corrosion inhibitor (suggested by Farkas in col. 3, line 24), such as BTA, is well known to one skill in the art. Grumbine shows using corrosion inhibitor including BTA in table

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1 and col. 5, line 27-30. Even though he doesn't describe the corrosion inhibitor concentration is in molar. His suggested concentration of 0.001-2.0 wt% would overlapped claimed 0.002-0.005 molar. The concentration of corrosion inhibitor would have been obvious to one skill in the art to determined through test runs in order to achieve an optimum concentration that polish metal with an anticipation of an expected result.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DuyVu n Deo whose telephone number is 703-305-0515.

DVD

May 24, 2001

  
BENJAMIN L. UTECH  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700